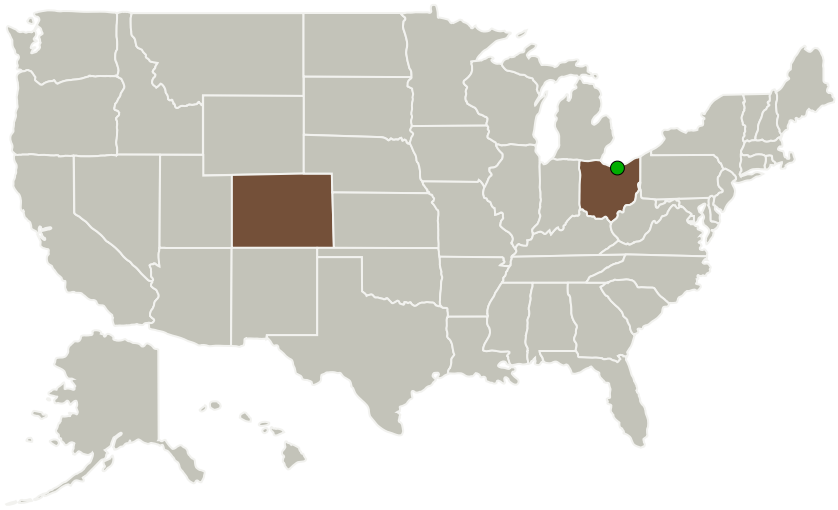
Ultra High Temperature Capacitive Pressure Sensor, Phase I

Completed Technology Project (2010 - 2010)

Project Introduction

To improve the working performance, increase efficiency, reduce cost, and track system health status and failure modes of advanced propulsion systems; miniaturized, robust sensing systems for measuring and monitoring physical parameters, such as pressure, would be highly advantageous. Technical challenges for developing reliable sensing systems lie in extremely harsh working conditions the micro sensors must operate. In addition to high temperatures and pressures, these conditions include oxidation, corrosion, thermal shock, fatigue, fouling, and abrasive wear. High temperature (300-1350oC) capacitive pressure sensors are of particular interest due to their inherent suitability for wireless readout schemes. The objective of this proposed work is to develop a capacitive pressure sensor based on SiCN, a new class of high temperature ceramic materials, which possess excellent mechanical and electric properties at high temperatures (up to1600 ºC). The Phase I effort will include an evaluation of sensor designs and fabrication concepts, and the experimental evaluation of proof of principle scale prototypes. This technology, which is currently at TRL 2, will be advanced to TRL 4 at the end of Phase I.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Sporian Microsystems, Inc.	Lead Organization	Industry	Lafayette, Colorado
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Colorado	Ohio

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137791)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Sporian Microsystems, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Kevin Harsh

Co-Investigator:

Kevin Harsh

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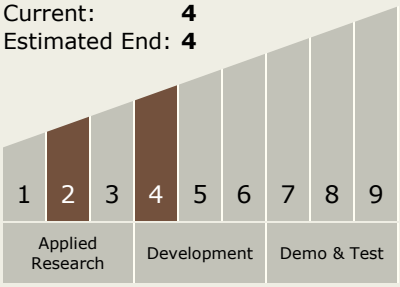
Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.6 Extreme Environments Related to Critical System Health Management

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System